



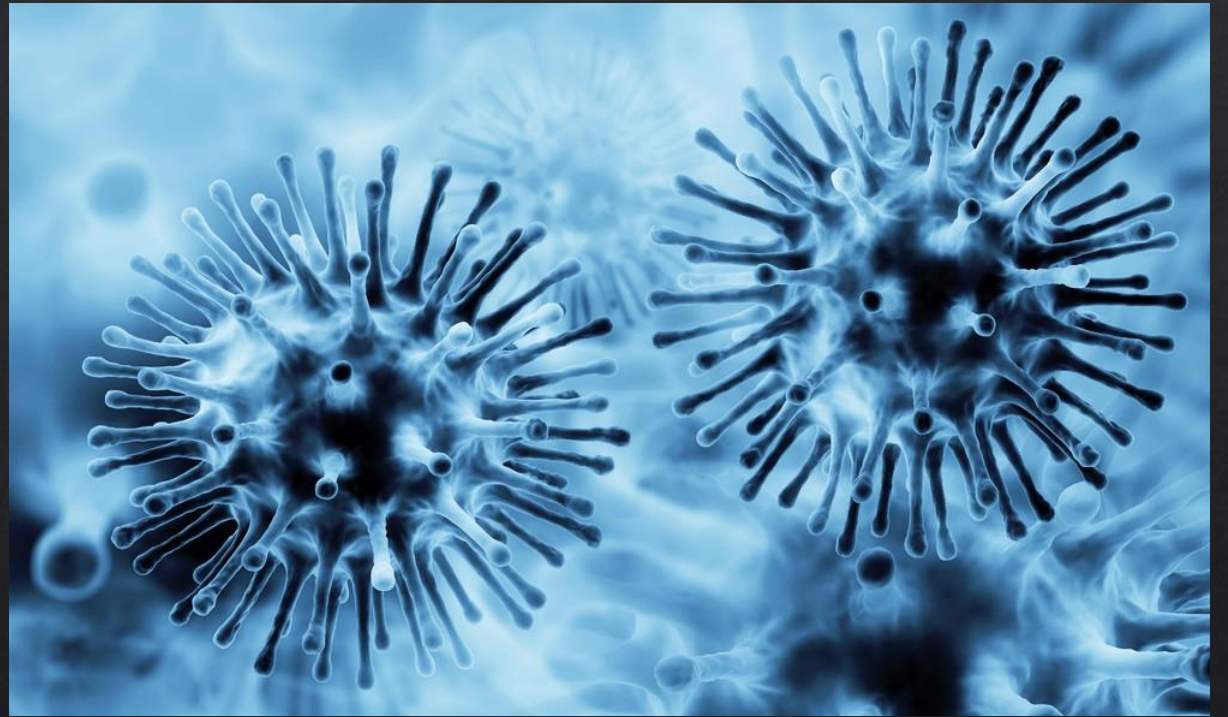
Diagnosing Pneumonia with CNNs

Flatiron Data Science – Phase 4

Evan Holder



What is Pneumonia?

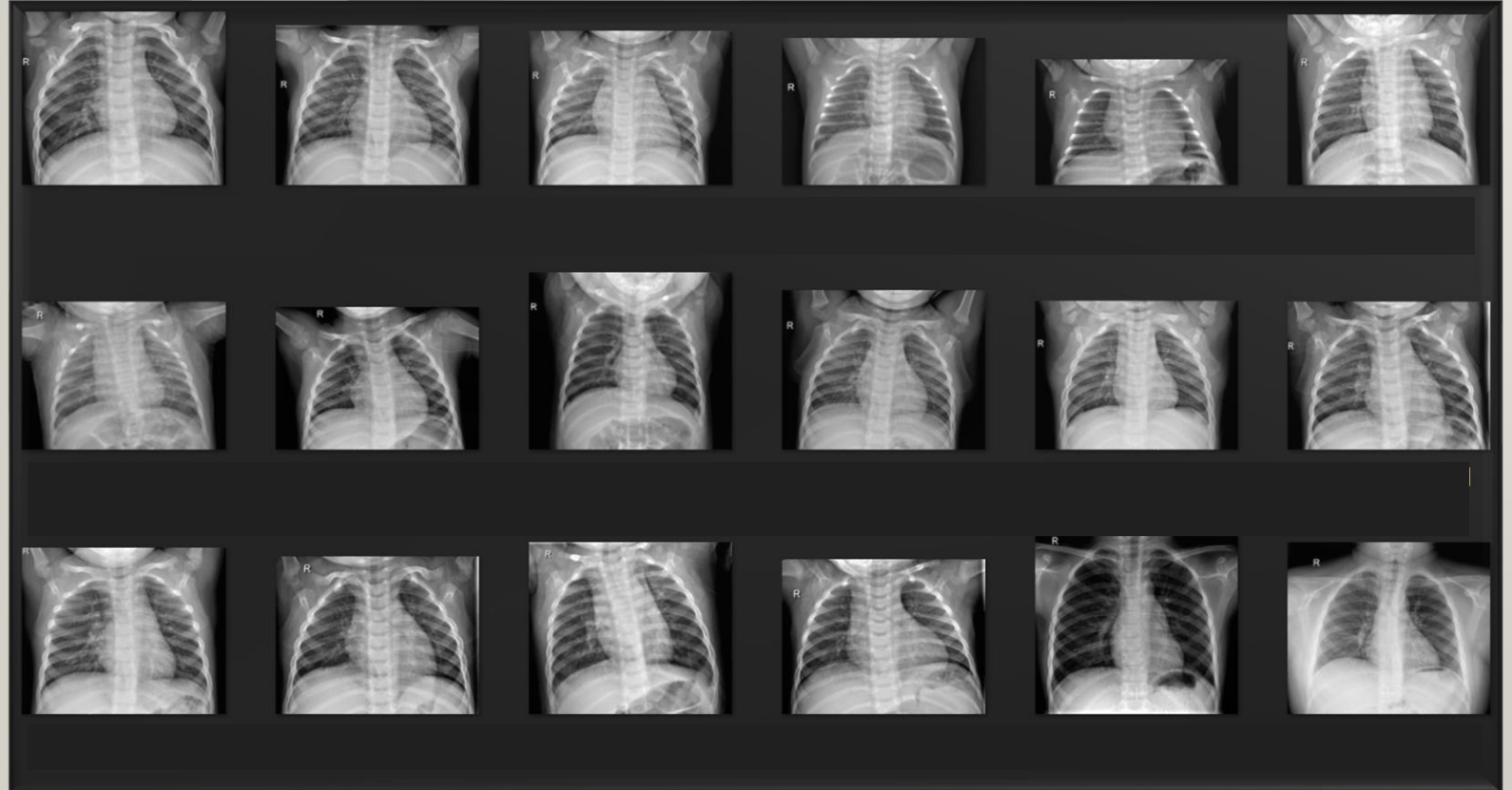


Diagnosis

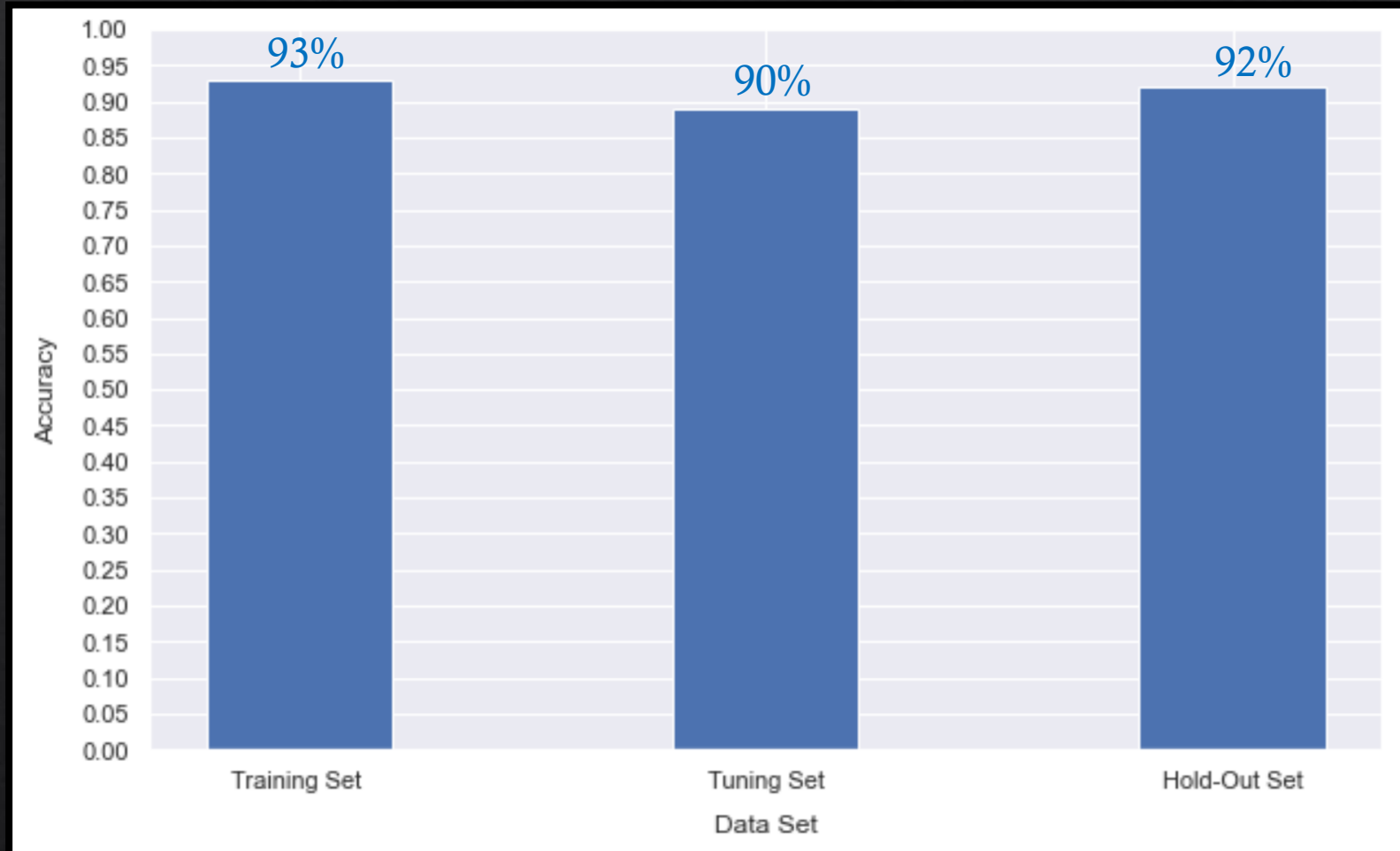


The Data

- ◇ Built using 5,856 xray images from Mendeley Data
 - ◇ 70% (4100) – Training
 - ◇ 15% (878) – Tuning
 - ◇ 15% (878) – Holdout



Model Validation



Model Results

True Normal

411

28

**True
Pneumonia**

45

394

**Predicted
Normal**

**Predicted
Pneumonia**



Model Results – Holdout Set

True Normal	411	28
True Pneumonia	45	394
	Predicted Normal	Predicted Pneumonia

Overall Accuracy: 92%



Model Results – Holdout Set

	Predicted	
	Normal	Pneumonia
True Normal	411	28
True Pneumonia	45	394

Overall Accuracy: 92%

Pneumonia Precision: 90%



Model Results – Holdout Set

	Predicted	
	Normal	Pneumonia
True Normal	411	28
True Pneumonia	45	394

Overall Accuracy: 92%

Pneumonia Precision: 90%

Normal Precision: 94%



Model Results – Holdout Set

	Predicted	
	Normal	Pneumonia
True Normal	411	28
True Pneumonia	45	394

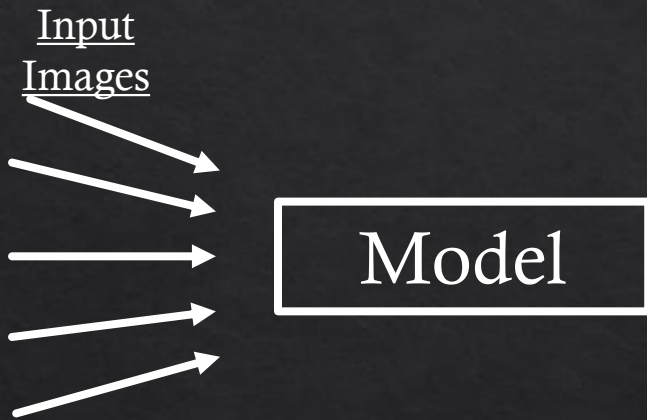
Overall Accuracy: 92%

Pneumonia Precision: 90%

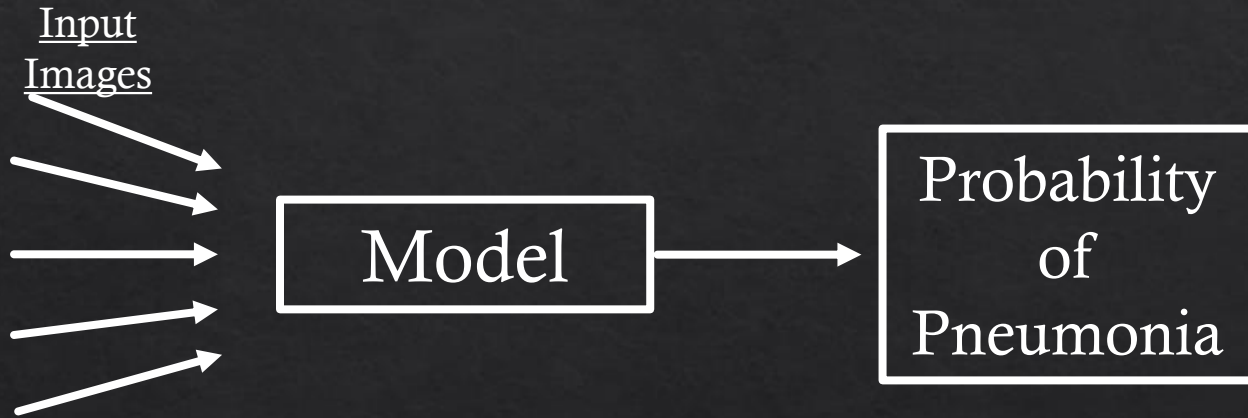
Normal Precision: 94%



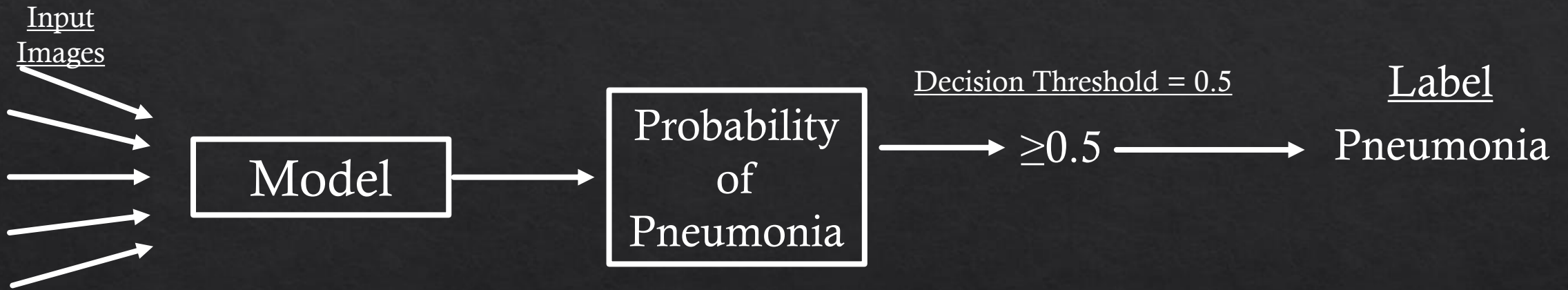
Model Decision Threshold



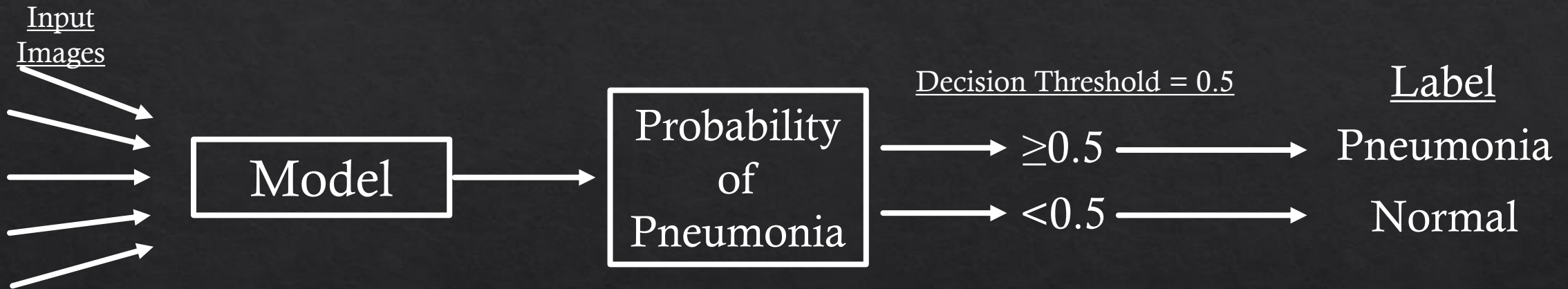
Model Decision Threshold



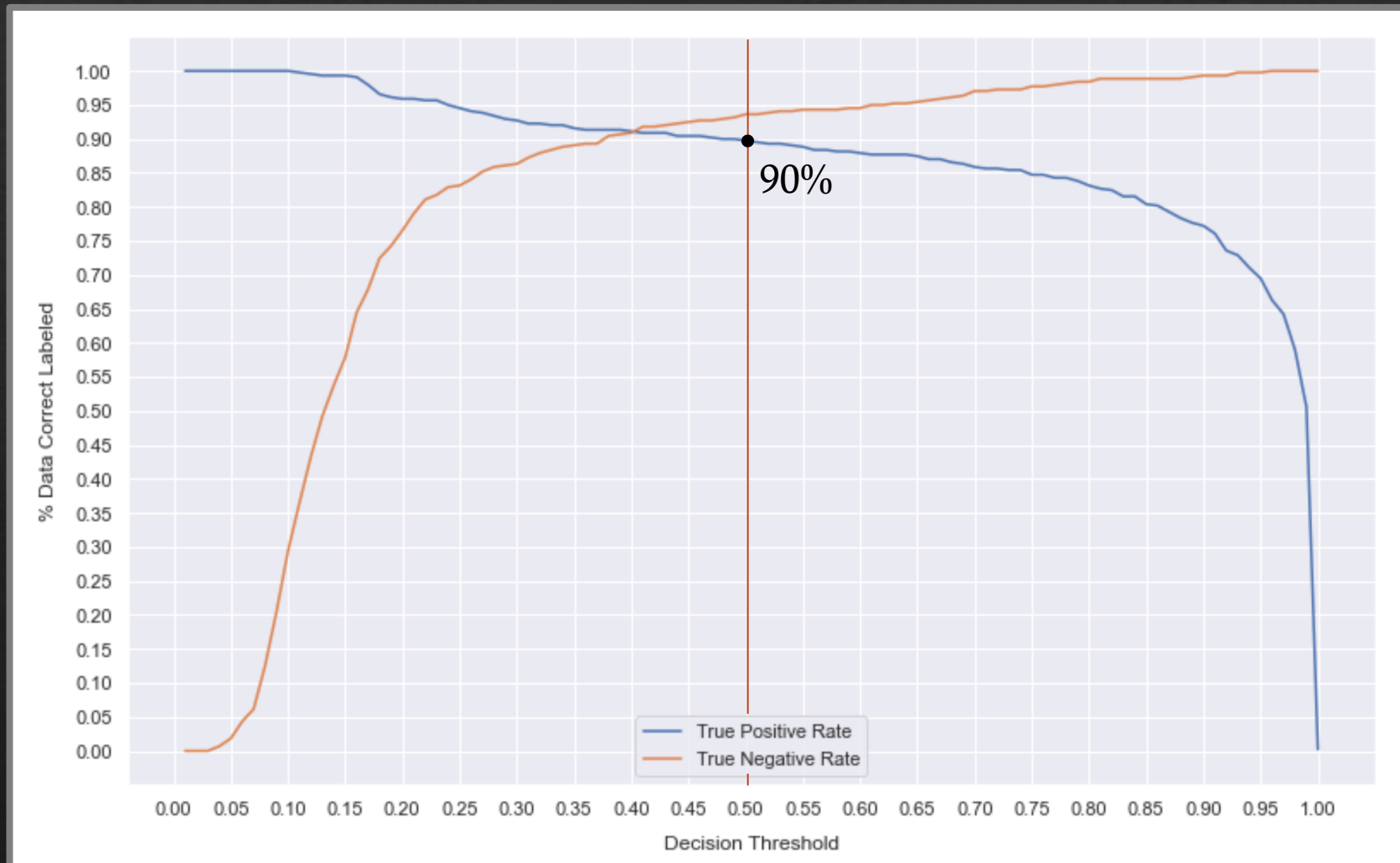
Model Decision Threshold



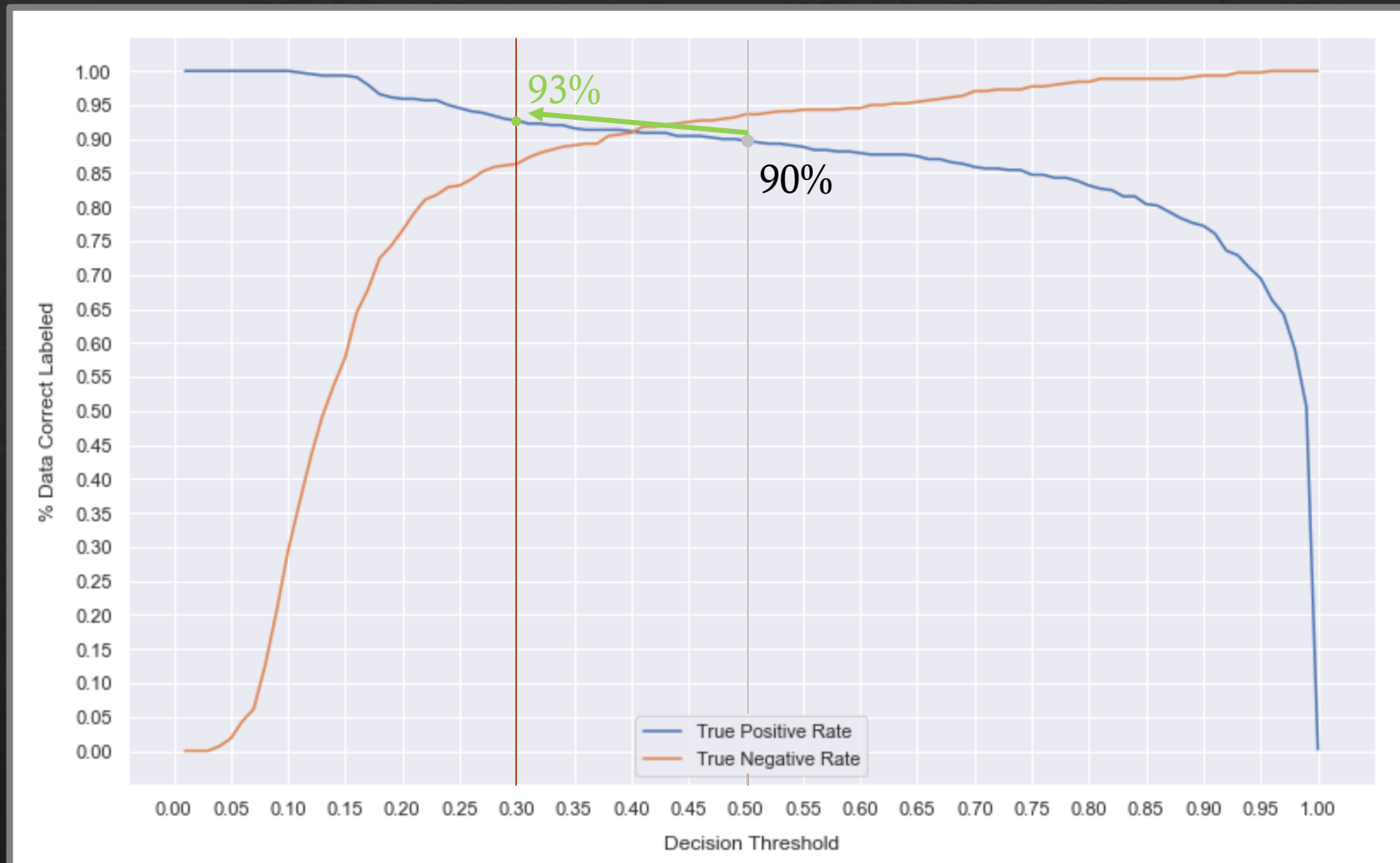
Model Decision Threshold



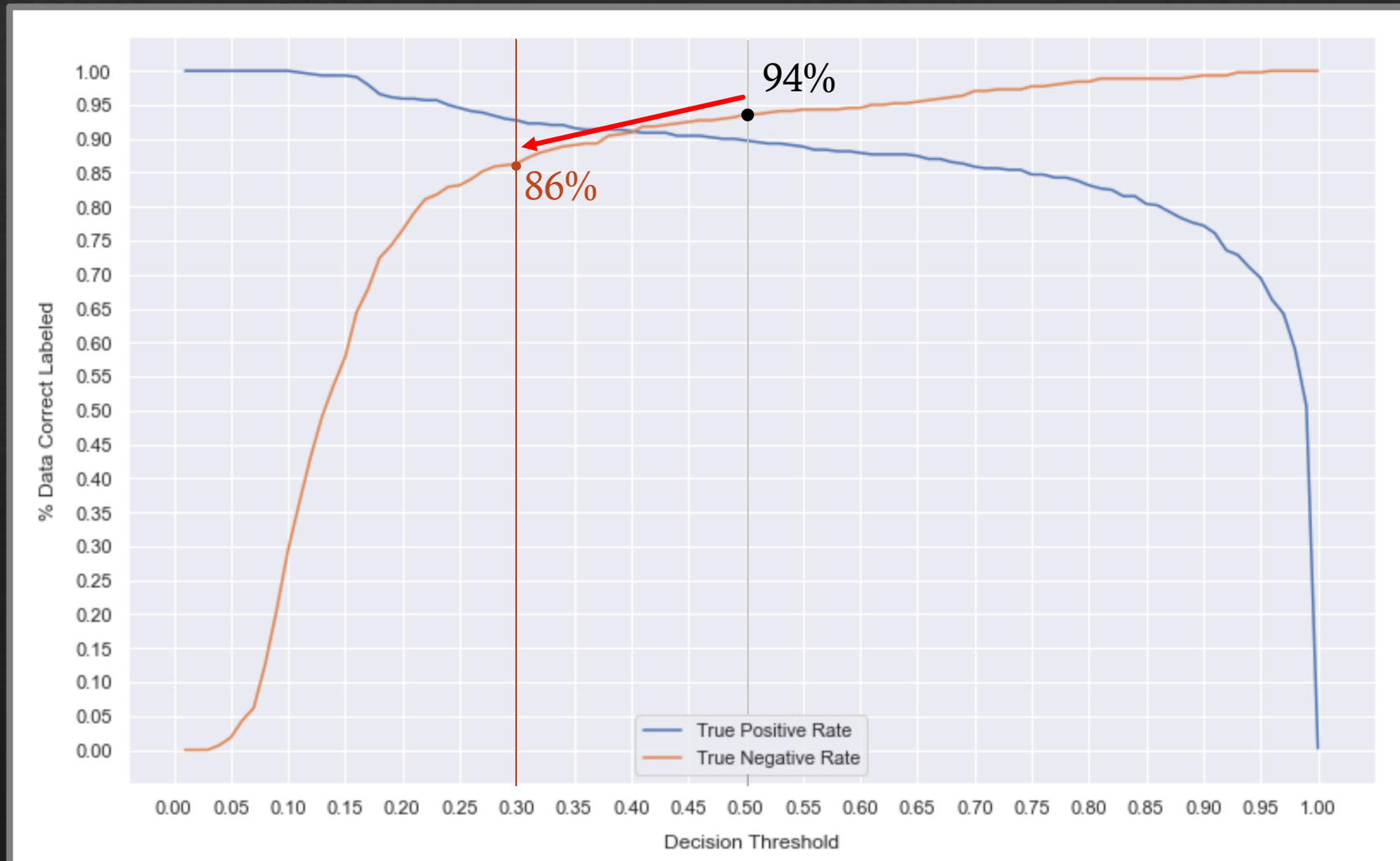
Sensitivity and Specificity



Sensitivity and Specificity

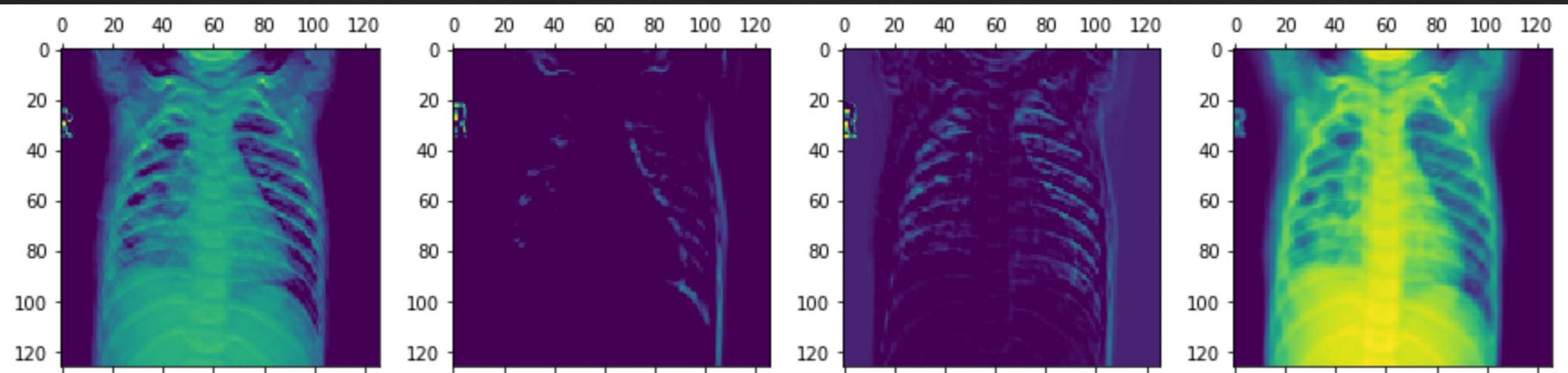


Sensitivity and Specificity



Improvements

- ◇ Minimize false negatives
 - ◇ More image training data
 - ◇ Image enhancement techniques
 - ◇ Architectural/tuning consultation with a medical professional



Thank You!

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